

MUSCULOSKELETAL PROBLEMS OF ARTISANS IN INFORMAL SECTOR- A REVIEW STUDY

A. MRUNALINI¹ & S. LOGESWARI²

¹Professor and University Head, Department of Resource Management and Consumer Sciences,

Professor Jayashankar Telangana State Agricultural University, Telangana, India

²Research Scholar, Department of Resource Management and Consumer Sciences, Professor Jayashankar

Telangana State Agricultural University, Telangana, India

ABSTRACT

The present paper reviewed on musculoskeletal problems of the workers in unorganized occupations viz., jewellery making, pottery, stone carving, metal craft work, wood carving and patti work. About 15 studies collected from International and national journals were examined. The purpose of the study is to understand the nature of musculoskeletal problems faced by the artisans, the techniques that were used to assess the musculoskeletal problem and the interventions that were suggested for relief. There was no quantifiable technique in the studies to prove musculoskeletal disorder, thus only the musculoskeletal problems were identified. Nordic musculoskeletal questionnaire was the standardized qualitative technique used in the studies. High prevalence of musculoskeletal problems in the form of pain in body parts and discomforts were reported by the artisans. Ergonomic interventions and personal protective measures were the major interventions suggested in the studies.

KEYWORDS: Musculoskeletal Discomfort, Artisans, Informal Sector, Techniques, Ergonomics

Received: Jan 22, 2016; **Accepted:** Feb 04, 2016; **Published:** Feb 06, 2015; **Paper Id.:** IJEEFUSFEB201616

INTRODUCTION

Handicraft industry is a major source of income for rural communities employing over six million artisans in India. A large number of them were women belonging to the weaker sections of the society. Artisans belonging to the informal sector are subject to numerous workplace disorders. Since they are unorganized, they are not supported by any occupational health and safety measures.

Though reviews are available as micro level studies on the handicraft sector, a comprehensive information on the techniques used to assess the musculoskeletal problems, the nature of data presentation was not available to guide the scientists and scholars for either to choose a popular technique or for data comparison across the states or nations.

Therefore the present review study was attempted with the following objectives:

- To review the techniques used to assess the musculoskeletal problems across the studies collected.
- To compile the nature of data reporting done in case of musculoskeletal problems.
- To identify the remedial measures suggested in the studies to relieve musculoskeletal problems.

LITERATURE REVIEW

Ninety percent of enterprises where conditions are often very poor. Tadesse and Admassu (2006) has reported that annually, an estimated 160 million new cases of work-related diseases occur worldwide, including respiratory and cardiovascular diseases, cancer, hearing loss, musculoskeletal and reproductive disorders, mental and neurological illnesses.

Various studies on occupational health hazards has stated that the most prevalent health impairments are musculoskeletal disorders and low back pain, allergic reactions and other respiratory disorders, noise-induced hearing loss, physical strain, fatigue and stress. Workers are forced to work long hours since the returns are directly proportionate to production, and also because most small and micro enterprises cannot afford to employ the required workforce. Workers in the informal sector engage in manual handling such as repetitive working movements, carrying of heavy loads and awkward postures, lifting, twisting, bending, pushing and pulling. These activities cause strain on the workers and fatigue, leading to injuries and cases of ill health (Lehtinen and Joronen, 2012; Gabe, 2010; AhmadWani and Jaiswal, 2011).

Meena et al., (2011) reviewed on the ergonomic factors in handicraft industries. The study reported that major problems associated with handicraft producing operations, awkward postures in different parts of body (i.e. neck, shoulders, elbows, wrists/hands, upper back, lower back, thigh, knees, and ankles). It is concluded that the high rate of absenteeism has an adverse effect on quality and quantity of production, efficiency of workers and organization, organizational discipline and more importantly on the organization's intention to fulfill the new market demands. Ergonomic intervention and ergonomic redesign of workstations to improve posture and working conditions helps in reducing workers discomfort and fatigue, increasing productivity and a significant reduction of relief related to musculoskeletal problems.

Therefore there is need to investigate on the scientific investigation techniques and methods so that more insights can be traced related to musculoskeletal problems.

METHODOLOGY

Fifteen studies were collected from National and International journals which focused on musculoskeletal problems of workers in informal occupational sector. The complete articles from the year 2006 to 2016 in online open journals were examined the details were presented below.

RESULTS AND DISCUSSIONS

The different handicraft sectors that were focused in this paper are pottery, stone carving, metal craft, wood carving, jewellery and patti work.

Tools and Techniques Used in the Studies

Research techniques that were used to assess the musculoskeletal problems were presented in table 1.

Table 1: Tools and Techniques Used for Assessing Musculoskeletal Problems

Author	Year	Place	Sample	Technique
Parimalam et.al	2006	Tamil Nadu	155	Modified Nordic Musculoskeletal Questionnaire Rating of Perceived Exertion scale
Untimanon et. al,	2006	Thailand	100	Self-prepared Questionnaire
Mehrotra et al.,	2007	Asia	200	Self-prepared Questionnaire
Mukhopadhyay and Srivastava	2010	Jaipur	75	RULA, REBA, discomfort scale by body map
All India Artisans and Craftwork Welfare association	2010	Orissa	100	Self-prepared Questionnaire
Melzer and Iguti	2010	Brazil	235	Nordic Musculoskeletal Questionnaire
Katara	2013	Bihar	150 families	Self-prepared Questionnaire
Sahu et.al	2013	West Bengal	130	Nordic Musculoskeletal Questionnaire RULA, REBA, Discomfort scale (1-10)
Konark Institute of Science & Technology.	2013	Odisha	210	Self-prepared Questionnaire
Meena et.al	2013	Jaipur	160	Self-prepared Questionnaire
Samanta	2015	West Bengal	42 families	Self prepared Questionnaire
Khan and Singh	2015	Uttar Pradesh	100	Self prepared check list-survey
Salve U.R.	2015	Maharashtra	230	Questionnaire of the Computer Eyestrain Journal, Eye checkup, blink rate using handy cam
Soongkhang and Laohasiriwong	2015	Thailand	511	Self-prepared Questionnaire
Habibi et.al	2016	Iran	94	Nordic Musculoskeletal Questionnaire and OCRA index

Qualitative approach method of investigation was found predominant in ninety four percent of studies as per table. Among them seventy percent of the studies were carried out with self-prepared questionnaire. Only thirty percent of the studies used a standardized Nordic Musculoskeletal questionnaire. In thirteen percent of studies prevalence of musculoskeletal problems, were associated with the postural assessment obtained from Rapid Upper Limb Assessment (RULA) and Rapid Entire Body Assessment (REBA). Rating of Perceived exertion scale, body map discomfort scale, (Occupational Repetitive Action) OCRA index, were the other psychosocial qualitative research tools that were used among twenty six percent of the studies reviewed. The quantitative methods to assess the musculoskeletal discomfort level was only identified in one study in which handy camera was used to record the blinking rate of eye while working for jewellery making.

Nordic Musculoskeletal questionnaire (Andersson et. al., 1987) is a standardized and popular tool that is in use in ergonomic study literature as a reliable screening tool to assess the musculoskeletal problems. Similarly RULA is a tool that is meant to analyze the upper limb body posture and REBA to analyze the whole body posture while at work. These techniques help in associating awkward posture as a reason for the prevailing musculoskeletal problems.

The findings project that absence of studies at the micro level using standardized research tools not only constrain to make available informative, comparable data but also limit on maintaining uniformity in empirical reporting of data. The above mentioned standard qualitative methods if used either in conformity with the original tools or by adaptation would

help to serve useful information for comparing the various musculoskeletal problems. Therefore there is need to fill the research gap by using a common and valid tool in the investigation while reporting musculoskeletal problems in order that more reliable research information can be compiled with conformity.

Empirical Reporting of Musculoskeletal Problems

The nature of evidence reported on musculoskeletal problems was represented in table 2.

Table 2: Nature of Musculoskeletal Problems Reported

Author	Craft	Evidence of Data
Sahu et.al	Pottery and sculptor	Reported as percentage of prevalence of musculoskeletal pain experienced among population Lower back pain (88%) and neck pain (86%)
Mukhopadhyay and Srivastava	Stone Carving	Reported as percentage of prevalence of musculoskeletal discomfort and the work posture rating was associated to the identified problem.
Parimalam et.al	Bamboo	Reported as discomfort in lower back region. 96 % of the workers reported discomfort in low back region everyday.
Khan and Singh	Patti work	Reported as percentage of musculoskeletal pain as per body parts. Headache (98%), back problems (96%), pain in eyes (99%), neck pain (92%), shoulder pain (54%), and knee pain (62%) and pain in palm (78%) and wrist pain (89%).
Salve U.R.	Jewellery making	Reported that there were symptoms of visual problems, ocular surface, asthenopia, photophobia and musculoskeletal were more prevalent among the jewellery manufacturing workers.
Untimanon et. al	Jewellery making	Reported as percentage of people experiencing visual problems. Fifty-two percent of the workers had at least one kind of vision problem that might have affected their work performance, and 48.3% of the work sites had substandard illumination levels.
Melzer and Iguti	Pottery	Reported that 38.5% prevalence of musculoskeletal pain. The most affected locations were lower limbs (35%) and back (33%), followed by neck (9%), shoulders (9%), hand/wrists (9%), elbows (3.5%), and thoracic region (1.5%).
Habibi et.al	Handicraft	Reported that 50% of workers in the study suffered from pain in at least one of the upper limbs like shoulder, elbow, wrist, and fingers.
Meena et.al	Handicraft	Reported that low back and neck are the body parts that have more pain during work.
All India Artisans and Craftwork Welfare association	Dhokra metal work	Reported that musculoskeletal discomfort was prevalent among 85% of the craftsmen.
Konark Institute of Science & Technology	Brass metal work	Reported symptoms of muscle ache and fatigue in the body leading to discomfort.
Samanta	Dhokra metal work	22% reported visual problem such as eye strain as their major discomfort
Soongkhang and Laohasiriwong	Wood work	Prevalence of discomfort in shoulder (88%) and neck (70%) was reported by the workers.
Katara	Stone carving	The work process is tiring and long process leading to body pain was reported
Mehrotra et al.,	Pottery	Reported as percentage of prevalence of musculoskeletal pain. 28 % had headache, 22% reported back pain

The table revealed prevalence of musculoskeletal problems in the entire handicraft sector. However, forty six percent of the studies reported musculoskeletal problems as pain in body parts and evidence of data was presented in

percentages. Lower back, neck, shoulder, palm and wrist were the most affected body parts leading to muscle pain.

Fifty four percent of the studies have reported the problem as musculoskeletal discomfort and the data evidence was given in percentage. The above feature suggests that very few studies have made an effort to identify the specific musculoskeletal disorders, through diagnostic evidence and musculoskeletal disorders were mostly understood as pain and discomfort experiences in the body parts. It can be inferred here that the nature and magnitude of pain, frequency of its experience if scored would provide an index to musculoskeletal problems for treating further statistically for understanding its relation and association to work.

Interventions Proposed in the Studies Reviewed

The interventions that were suggested in the studies to reduce the prevalence of musculoskeletal problems were presented in table 3.

Table 3: Suggested Interventions

Author	Craft	Suggested Intervention
Mukhopadhyay and Srivastava	Stone Carving	Ergonomic intervention in the form of tool, workstation and process design.
Parimalam et.al	Bamboo	Periodical physical examination of the workforce for musculoskeletal disorders, arranging educational programmes for prevention of musculoskeletal problems, follow up workers and ergonomic consideration in work organization
Salve U.R.	Jewellery making	The workplace should to be modified to enhance the eye health and proper training for eye rest and eye exercise should be given.
Untimanon et. al, (2006).	Jewellery making	Improvement of lighting conditions, the introduction of short breaks, and correction of visual performance
Meena et.al	Handicraft	Development of workstation and hand tools of handicraft industries by using proper anthropometric data
Samanta	Dhokra craft work	There is need for free health camps. Health and production insurance should be popularized
Katara	Stone carving	Design of separate workstation and tools according to ergonomics to facilitate artisans

Among the fifteen studies only thirty seven percent of the studies had made some recommendations for giving interventions.

Application of ergonomics in tool design, work station and process were the major interventions suggested in ninety percent of the studies to reduce musculoskeletal discomforts of the artisans. Educating the artisans on the musculoskeletal problems and introducing safety measures in organization of work with short breaks were the other suggestions given in thirty seven percent of the studies. Periodical physical examination on the health of the artisan was suggested as intervention in twenty five percent of the studies.

From the table, it was clear that though studies were conducted in the handicraft unorganized sector of workers, there were very few studies that suggested remedial measures to reduce the identified musculoskeletal problems of the workers. Thus it is appropriate to suggest and conduct suitable interventions to reduce the musculo skeletal disorders and increase the productivity of the workers in these occupations.

CONCLUSIONS

The handicrafts sector is an important unorganized sector of Indian economy. The studies reviewed, stand as evidence that the musculoskeletal problems were prevailing among the artisans irrespective of different handicraft sectors. But, the empirical evidence reported was weak as it lacks in the usage of standardized national or international research tools for drawing comparable results. Very few studies attempted to correlate or associate the MSD with postures by evidence. Very few studies had suggested remedial measure to reduce the musculoskeletal problems in this vulnerable group. The action needed at present is that, the standard research tools need to be further popularized.

Some tools like Nordic Musculoskeletal Questionnaire may be used by all to quantitatively validate the musculoskeletal problems faced by the artisans. Thus, it would help to easy comparison of the data across the nation.

REFERENCES

1. Ahmad Wani and Jaiswal, Y. K. (2011). *Occupational Health Risk Factors in Carpet Industry: A Review*. *Asian Journal of Expert Biological Science*, 2(1), 135-139.
2. All India Artisans and Craftwork Welfare association. (2010). *Report on Environmental, occupational health and safety in the craft sector of India. Baseline study of selected craft sectors*. Retrieved from http://www.switch-asia.eu/fileadmin/user_upload/research-baseline-study-environment-occupational-health-safety-issues-the-crafts-sector.pdf
3. Andersson K, Karlehagen S, Jonsson B. (1987). *The importance of variations in questionnaire administration*. *Applied Ergonomics*, 18, 229-232.
4. Gabe, S. G. (2010). *Occupational health and safety survey in small-scale clothing enterprises in Gaborone, Botswana*, 12-19.
5. Habibi E., Zare, M., Haghi, A., Habibi, P., Hassanzadeh, A. (2016). *Assessment of physical risk factors among artisans using occupational repetitive actions and Nordic questionnaire*. *International Journal of Environmental Health Engineering*, 1(8), 1-6.
6. Katara, A. (2013). *An interactive design study of stone craft: need assessment survey report*. *Design Clinic Scheme. MSME. Bihar*, 23-36.
7. Khan, S., Singh, R. (2015). *Health and Diseases among Women working with "Pattiwork" Handicraft. (A Study in Aligarh City, U.P., India)*. *IOSR Journal Of Humanities And Social Science*, 20(3), 60-64.
8. Konark Institute of Science & Technology. (2013). *Bell & Brass metal work losing its shine in Odisha. Bhubaneswar*. Retrieved from http://www.kist.ac.in/data/research/Bell_metal.pdf
9. Lehtinen and Joronen. (2012). *Small-scale enterprises and informal sector*. *African Newsletter on Occupational Health and Safety*. Finnish Institute of Occupational Health. Helsinki, Finland, 22, 37-39.
10. Meena, M. L., Dangayach, G. S., Bhardwaj, A. (2013). *Measuring anthropometric data for designing hand tools in handicraft industries*. *International Journal of Process Management and Benchmarking*, 3(3), 334-351.
11. Meena, M. L., Dangayach, G. S and Bhardwa, A. (2011). *Impact of Ergonomic Factors in Handicraft Industries*. *International Conference on Mechanical, Production and Automobile Engineering*. Pattaya.
12. Mehrotra, Santosh and Mario Biggeri. (2007). *Asian Informal Workers: Global Risks Local Protection*. *Routledge Studies in the Growth Economies of Asia*. London and New York. Retrieved from <http://pottery.about.com/od/potteryglossaryqs/g/silica.html>

13. Melzer, A. C. S. and Iguti, A. M. (2010). Working conditions and musculoskeletal pain among Brazilian pottery workers. *Cad. Saúde Pública*, 26(3), 22-27.
14. Mukhopadhyay, P. and Srivastava, S. (2010). Evaluating ergonomic risk factors in non-regulated stone carving units of Jaipur. *Work*, 35(1), 87-99.
15. Parimalam, P., Balakamashi, K., Ganguli, A. K. (2006). Musculoskeletal Problems of women bamboo workers in Madurai, India. *Human Factors & Ergonomics Society of Australia 42nd Annual Conference*, 1-5.
16. Sahu, S., Moitra, S., Maity, S., Pandit, A. K., Roy, B. (2013). A Comparative Ergonomics Postural Assessment of Potters and Sculptors in the Unorganized Sector in West Bengal, India. *International Journal of Occupational Safety and Ergonomics*, 9(3), 455-462.
17. Salve, U. R. (2015). Vision-related problems among the workers engaged in jewellery manufacturing. *Indian Journal of Occupational and Environmental Medicine*, 19(1), 30-35.
18. Samanta, R. K. (2015). Socio-economic status of Dhokra Artisans a case study of Burdwan District, West Bengal, India. *International Journal of Current Research and Academic Review*, 3(7), 206-214.
19. Soongkhang, I. and Laohasiriwong, W. (2015). Respiratory Tract Problems among Wood Furniture Manufacturing Factory Workers in the Northeast of Thailand. *Kathmandu University Medical Journal*, 3-7.
20. Tadesse and Admassu. (2006). *Occupational Health and Safety: Ethiopia Public Health Training Initiative*. University of Gondar, 1-6.
21. Untimanon, O., Pacharatrakul, W., Boonmeepong, K., Thammagarun, L. (2006). Visual Problems among electronic and jewelry workers in Thailand. *Journal of Occupational Health*, 48(5), 407-412.

